



US005584806A

# United States Patent [19]

[11] **Patent Number:** **5,584,806**

**Amano**

[45] **Date of Patent:** **Dec. 17, 1996**

[54] **MEDICAL PUMP DRIVING DEVICE**

4,781,525 11/1988 Hubbard et al. .  
4,840,620 6/1989 Kobayashi et al. .

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### FOREIGN PATENT DOCUMENTS

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0100682 2/1984 European Pat. Off. .  
0228160 7/1987 European Pat. Off. .  
0357338 3/1990 European Pat. Off. .

[21] **Appl. No.:** 391,729

[22] **Filed:** Feb. 21, 1995

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### Related U.S. Application Data

[63] Continuation of Ser. No. 51,567, Apr. 22, 1993, Pat. No. 5,437,634, which is a continuation-in-part of Ser. No. 963,859, Oct. 20, 1992, abandoned.

### [57] ABSTRACT

### [30] Foreign Application Priority Data

Oct. 23, 1991 [JP] Japan ..... 3-275253  
Oct. 23, 1991 [JP] Japan ..... 3-275254

A medical pump driving device comprises a centrifugal pump for transferring liquid in a liquid channel including an artificial lungs, a motor for driving the centrifugal pump, and a bubble removing mechanism for removing a bubble from the liquid channel including the medical device by transferring liquid by the pump. The bubble removing mechanism comprises a CPU for setting various types of set values to intermittently drive the motor, a RAM and an EEPROM for storing the set value set by the CPU, an D/A converter 251, and motor driving circuit for intermittently driving the motor based on the set value stored in the RAM, and EEPROM.

[51] **Int. Cl.<sup>6</sup>** ..... **A61M 5/00**

[52] **U.S. Cl.** ..... **604/65**

[58] **Field of Search** ..... 604/65, 66, 67,  
604/251, 253, 30-34, 49-53, 151

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,261,360 4/1981 Perez .  
4,401,431 8/1983 Arp .

**8 Claims, 16 Drawing Sheets**

